June 11, 1963 E. E. BIBY 3,092,846

DUAL SOFA BED

Filed Feb. 23, 1961 2 Sheets-Sheet 1

Fig. 1

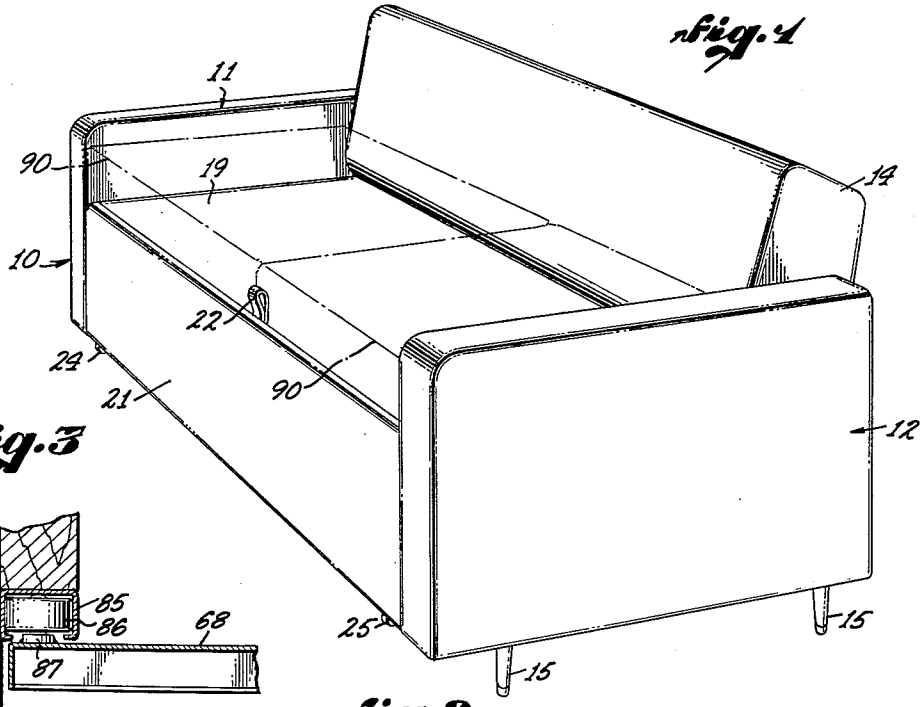


Fig. 3

Fig. 2

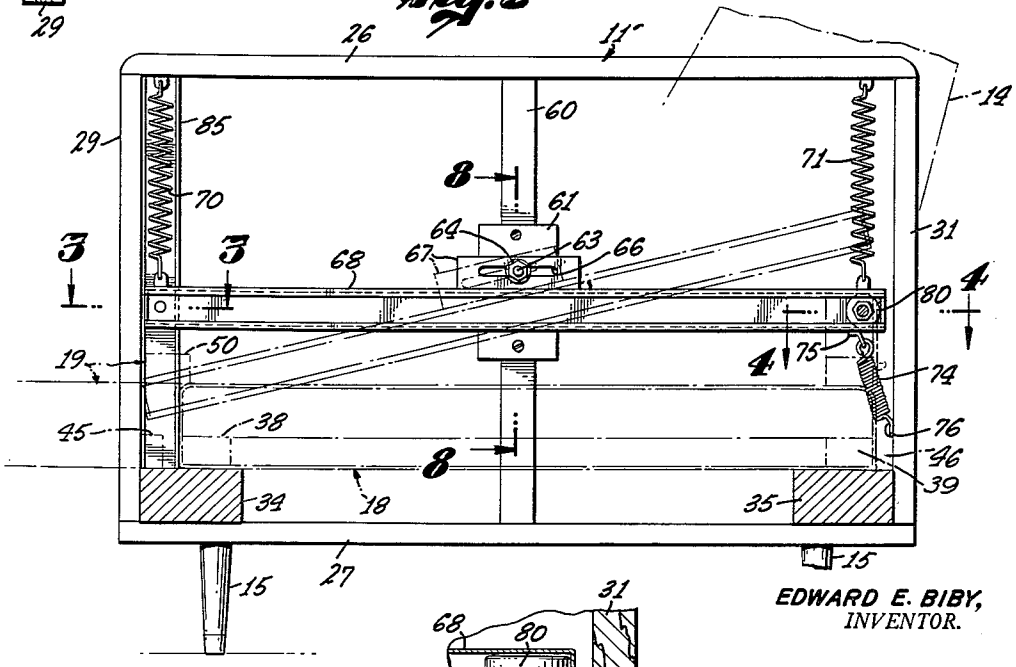
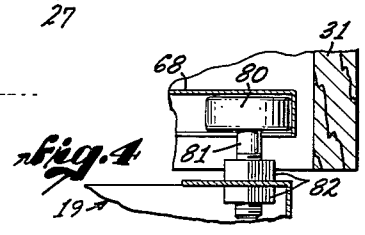


Fig. 4



EDWARD E. BIBY,
INVENTOR.

BY

Albert M. Kenyon

ATTORNEY.

June 11, 1963 E. E. BIBY 3,092,846

DUAL SOFA BED

Filed Feb. 23, 1961

2 Sheets-Sheet 2

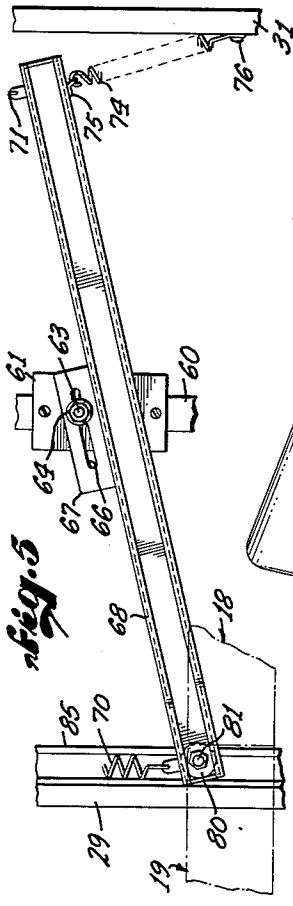


Fig. 5

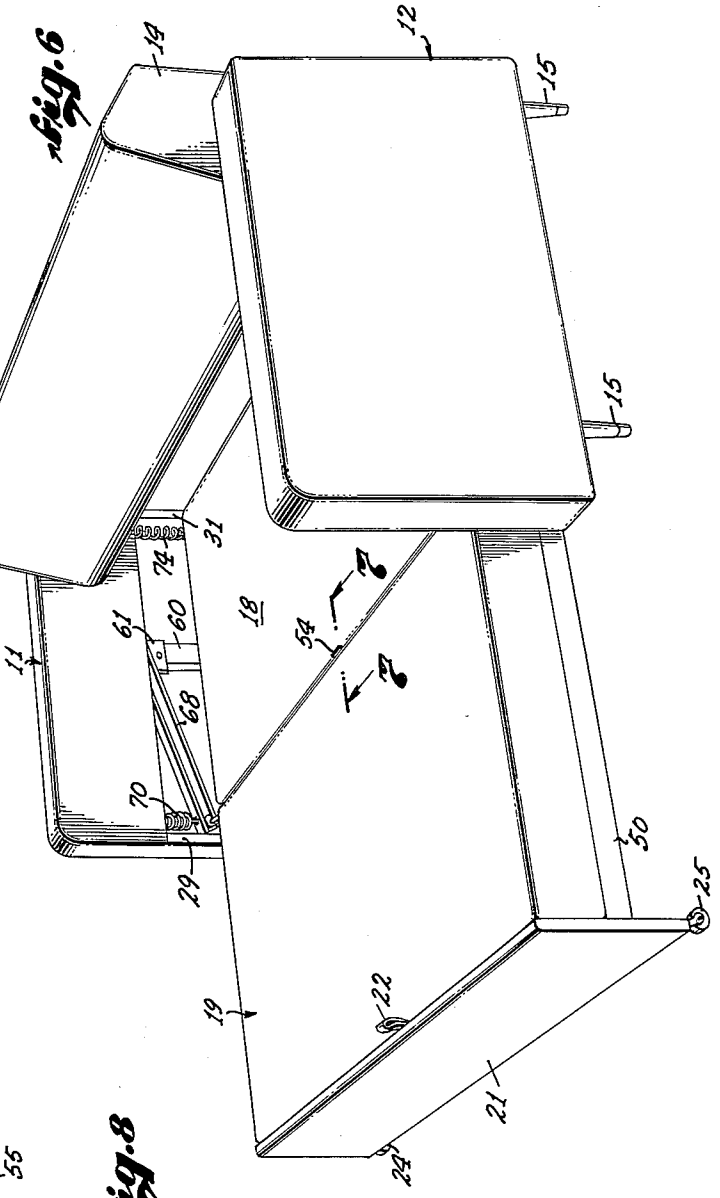


Fig. 6

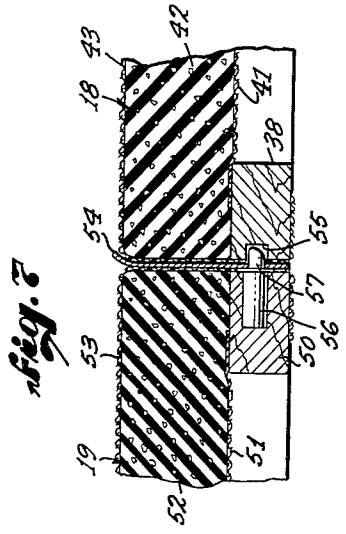


Fig. 7

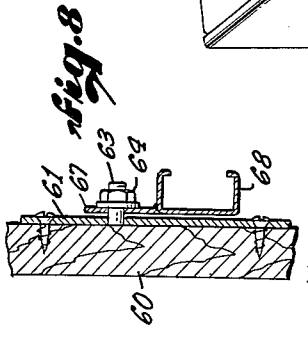


Fig. 8

EDWARD E. BIBY,
INVENTOR.

BY Albert Hoberg

ATTORNEY.

United States Patent Office 3,092,846 Patented June 11, 1963

3,092,846

DUAL SOFA BED

Edward E. Biby, 5725 Avalon Blvd., Los Angeles, Calif.

Filed Feb. 23, 1961, Ser. No. 91,267
7 Claims. (Cl. 5—18)

This invention relates to an improved sofa bed, that is, a sofa which is readily extensible or convertible into a bed or sleeping accommodation or facility. The invention resides more particularly in the improved and simplified means for extending and collapsing or folding parts of the structure whereby it is inter-changeably convertible from a sofa to a bed and back again.

Sofa beds have been known in the prior art provided with means for converting the article from a sofa to a bed or sleeping accommodation. However, the prior art devices have been deficient from the standpoint of certain desired characteristics. In such an apparatus or article, primary considerations are that the device or mechanism should embody simplicity and further, it must be easy and convenient to operate, that is, to extend it into a sleeping accommodation or facility and to retract it or collapse it back into a sofa.

The herein invention broadly is characterized in having frames, one of which is normally superposed over the other and which is extendible forwardly and downwardly to provide a bed or sleeping facility. The invention provides significant improvements in the means or mechanism for moving the upper frame outwardly and forwardly and for retracting it by lifting it and moving it inwardly into its normal superposed position. It is accordingly a primary object of the invention to provide improved, simplified, but highly effective means in a combination sofa bed for converting the sofa to a bed or sleeping facility and reconverting it to a sofa.

A further object is to provide an improved sofa bed as in the foregoing comprising superimposed frames, and means providing for guided outward and downward movement of the upper frame and also for guided upward and inward movement of the upper frame.

Another object is to provide a sofa bed as in the foregoing wherein the guide means are in the form of trackways including trackways providing for the outward and inward movement of the upper frame, which are mounted for limited pivotal movement and limited linear movement as well so as to accommodate the horizontal and vertical components of movement of the upper frame.

Another object is to provide an improved sofa bed as in the foregoing objects including vertical trackways or guide-ways to guide the vertical movement and means whereby end parts of the horizontal trackways are guided in the vertical trackways.

Another object is to provide counter-balancing means for the movable trackways to facilitate and stabilize the operation.

Another object is to provide additional counter-balancing means to accommodate and facilitate the lifting of the frame when it is lifted to be returned to a superimposed position.

Another object is to provide locking means automatically engageable when the frames are brought into adjacent alignment to hold the upper frame in sleeping position, such locking means being disengageable upon upward tilting movement of the front edge of the upper frame.

Further detailed objects and additional advantages will become apparent from the following detailed description and annexed drawings, wherein:

FIG. 1 is a perspective view of a sofa bed embodying the herein invention;

FIG. 2 is a sectional view of one end of the sofa bed showing the mechanism at the ends thereof;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 2;

FIG. 5 is a detail view of one of the guide-ways providing for in and out movement of the upper frame;

FIG. 6 is a perspective view of the sofa bed extended into position to form a sleeping accommodation or facility;

FIG. 7 is a sectional view taken along the line 7—7 of FIG. 6; and

FIG. 8 is a sectional view taken along the line 8—8 of FIG. 2.

Referring now more in detail to the drawings, FIG. 1 shows by way of example a sofa bed having the herein invention embodied therein. It has a pair of identically formed end members 11 and 12 forming arm rests and a back part or back rest 14 which is cushioned and which may be of a type known in the art. The end members 11 and 12 are provided with legs as shown at 15. The sofa has embodied within it a lower frame 18 and an upper frame 19, as may be seen in FIG. 6, the frame 19 normally being superimposed over the frame 18 as is shown in the position of FIG. 1. The frame 19 has a front panel 21 at the upper part of which is a flexible loop 22 adapted for manipulating the structure as will be described presently. Attached to the lower edge of the panel 21 are castors 24 and 25 to facilitate extending or rolling out the frame 19 as will be described in detail hereinafter.

The interior of the end member 11 may be seen in FIG. 6 and this interior structure is illustrated more in detail in FIGS. 2 to 5 and 8. FIG. 2 represents the interior of the end member 11. This end member 11 has top and bottom members 26 and 27, respectively, and front and back members 29 and 31 which may be appropriately covered or upholstered. The sofa structure has longitudinal beams or members 34 and 35 which may be made of wood extending lengthwise of the sofa and positioned in the corner of the end members 11 and 12 as may be seen in FIG. 2. The frame 18 rests on the beams 34 and 35. The frame 18 is shown partly in cross-section in FIG. 7. It may be formed of wooden frame members, the longitudinal ones of which are designated at 38 and 39 in FIG. 2. Supported by the frame members are webs 41 as may be seen in FIG. 7 which might be made either of cloth or of a relatively thin metal or other material. Supported on the webs is a mattress shown by way of example as being constituted by foam rubber as designated at 42. The foam rubber is preferably covered, as for example, by upholstery material as designated at 43 which covers its top and sides and is extended down underneath the frame members as may be seen in FIG. 7. Numeral 45 is a longitudinal brace member overlying the beam 34 and numeral 46 designates a similar longitudinal brace member at the back overlying the beam 35.

The upper frame 19, which in the sofa position is superimposed over the frame 18, is of a similar construction. It is a rectangular frame structure made up of frame members such as designated at 50 in FIG. 7. Overlying these members are webs 51 corresponding to the webs 41 supporting the foam rubber mattress 52 covered with material such as upholstery 53. Numeral 54 designates a latch plate on the outer side of the frame 18 having a bolt receiving opening registering with an opening 55 in the beam 38. Positioned in the beam 50 opposite the latch plate opening is a latch housing 56 in which is a spring actuated bolt 57. As will be described hereinafter, when the frame 19 is moved outwardly and low-

ered into the position of FIG. 7, the bolt 57 automatically latches into the openings, holding the frames in position. The latch will release, however, when the outer part of the frame 19 is lifted to withdraw the bolt 57 from the openings.

Referring again to FIG. 2, numeral 60 designates an upright intermediate post or standard in the end member 11. Supported on this post is a plate 61 attached by screws as shown in FIG. 8. Extending outwardly from the plate 61 is a bolt 63 on which is a nut 64, this bolt extending through a slot 66 in a support plate 67 for a track 68. The track 68 preferably has a C-section as shown in FIG. 8. The track 68 extends fore and aft of the sofa within the frame 11. It is to be understood that the mechanism at opposite ends of the sofa within the end members 11 and 12 is the same. From the description, it will be apparent that the track 68 is mounted for pivotal movement about the bolt 63 and that it may also have limited linear movement by reason of the plate 67 having slot 66, being free to move relatively to the bolt.

Numeral 70 designates a coil tension spring attached to one end of the track 68 and also attached to the upper member 26 of end member 11. Numeral 71 designates a similar tension spring attached to the other end of the track 68 and to the frame member 26. These springs tend to normally hold the track 68 in a horizontal position and to return it to that position when moved out of it. That is, they are essentially stabilizing springs.

Numeral 74 designates an additional tension spring attached to the rear end of the track 68 as designated at 75 and to the back wall member 31 as designated at 76. The purpose of the spring 74 is to assist in lifting the frame 19 when it is being returned to the sofa position as will be described hereinafter. It should be remembered also that the structure being described is the same at both end members 11 and 12 of the sofa.

The frame 19 is provided with rollers at its ends in a position adjacent its inner edge. One of the rollers is designated at 80 in FIG. 4. It is shaped to move in the track 68. It is on an axle 81 which is attached to the frame 19 by nuts 82 as shown in FIG. 4. The rollers 80 moving in the track 68 guide the in and out movement of the inner part of the frame 19.

Adjacent the front member 29 of the end member 11, there is provided a vertical trackway 85 of C-section as may be seen in FIG. 3. Numeral 86 designates a roller of a size to move in this trackway. It is on an axle extending from a boss or bushing 87 on the end of the track 68.

From the foregoing, it can be seen that the trackways 85 and rollers 86 guide the forward ends of the tracks 68 so that they move up and down vertically. This vertical movement is accommodated and made possible by the pivotal mounting of the tracks 68 and the fact that the slots 66 allow limited movement of the tracks 68 in the direction of their length. FIG. 5 shows the movement when the forward ends of the tracks 68 are moved downwardly.

From the foregoing, those skilled in the art will be readily able to observe and understand the operation of the mechanism in converting the article from the sofa position of FIG. 1 to the sleeping facility of FIG. 6 and back again. The sofa as shown in FIG. 1 may of course be provided with removable cushions as designated in outline by numeral 90.

In extending or converting the sofa to a bed, the operator removes the cushions 90. The loop 22 may then be manually grasped and the upper frame 19 is first pulled outwardly. The outer panel 21 may be lifted slightly to lift the upper frame 19 off the lower frame 18. It is then pulled out with the rollers 80 moving outwardly in the tracks 68. When these rollers reach the end of the tracks 68 with the frame 19 out as far as it will go, the ends of the tracks 68 then move downwardly with the rollers 86 moving downwardly in the trackways 85. That is, the frame 19 then gently moves downwardly into the position of FIG. 6 juxtaposed against the front edge of the frame 18. The frames are latched together by the latch bolt 57 as described in connection with FIG. 7 as soon as the rear edge of frame 19 is lowered. The outward movement of the frame 19 is smooth and uniform as regulated by the tracks 68. The lowering of the frame 19 is easy and gentle since it is facilitated by the springs. The springs 70 and 71 stabilize the tracks 68 so that the lowering is smooth and uniform. Furthermore, as the frame 19 is lowered, its weight is placed on the tracks 68 tending to rotate them about their pivots thereby further tensioning the springs 74. That is, the springs 74 take some of the load imposed by lowering the frame 19. As explained above, as the tracks 68 rotate about their pivots, they also move along their length sufficiently to accommodate the vertical movement in the trackways 85.

In collapsing the article or returning it to the sofa position, the operator then again grasps the hand hold 22 and lifts the frame 19. It is first tilted by lifting its outer edge and it then lifts bodily by reason of the counter-balancing effect of the springs 70 and 74. That is, only a small amount of lift is necessary to cause the frame 19 to move upwardly under the influence of springs 70 and 74 acting on the tracks 68. Its inner edge moves vertically as before with rollers 86 moving up in trackways 85. When the tracks 68 reach their horizontal position again, the frame 19 is merely rolled inwardly with the rollers 80 moving inwardly in the tracks 68. This places the frame 19 in its position superimposed over the frame 18.

From the foregoing, those skilled in the art will observe that the invention achieves the objects and advantages as stated in the foregoing. It provides a simplified, but extremely effective means or mechanism whereby a sofa is readily converted into a bed or sleeping facility and also readily collapsed or re-converted into a sofa. The mechanism is fully housed and enclosed within the sofa and is of an extremely durable, rugged, effective and simplified nature. No intricate mechanisms or delicate parts are used. Furthermore, the operating parts are counter-balanced and stabilized for effective, smooth operation and springs make the lifting of the frame 19 extremely easy because they take the greater part of the load. In making the conversion, the movements are confined to the necessary horizontal and vertical movements which are controlled and effectuated by very dependable and positive acting mechanism.

The foregoing disclosure is representative of a preferred form of the invention and is to be interpreted in an illustrative rather than a limiting sense, the invention to be accorded the full scope of the claims appended hereto.

What is claimed is:

1. An article of furniture comprising:
a pair of substantially identically formed end members,
a stationary lower frame disposed between said end members,
a movable upper frame normally disposed in superimposed relationship above said lower frame,
cushioning means carried by each of said frames,
a vertically directed standard disposed adjacent the midportion of each of said end members,
a bolt mounted adjacent the midportion of each of said standards,
an elongated straight track disposed within each of said end members, each of said tracks normally extending in a straight horizontal direction transversely to said standards,
a support plate mounted adjacent the midportion of each of said tracks, each of said support plates having an elongated horizontal opening therein, said bolts extending into said openings and being slidable therein to permit limited forward and rearward linear

movement of said tracks with respect to said standards,

said bolts providing axes for the pivotal movement of said tracks with respect to said standards,

a roller carried by each of the upper rear corners of said upper frame, said rollers being mounted for horizontal rotational movement within said tracks,

a pair of coil springs attached at their lower ends to the forward ends of said track and at their upper ends to the upper portions of said end members, said coil springs normally urging said tracks toward a straight horizontal position,

a pair of vertically directed trackways disposed adjacent the forward portions of said end members,

a roller carried by the forward end of each of said tracks, said rollers being mounted for vertical rotational movement within said trackways upon the pivotal movement of said tracks,

said upper frame being mounted for movement forwardly and downwardly to a position directly adjacent to said lower frame, in which the upper surfaces of said frames are disposed in substantially the same plane,

said rollers on the corners of said upper frame being adapted to move forwardly along said tracks and to pivot the forward ends of said tracks downwardly, the rollers at the forward ends of said tracks being adapted to move downwardly within said trackways, said tracks being adapted to move slightly forwardly by relative movement of said bolts within said slots,

said upper frame adapted to be moved upwardly and rearwardly back to its normal position, said coil springs being adapted to assist in lifting said upper frame and returning said tracks toward their normal positions, and said rollers being adapted to move in the opposite directions within said tracks and trackways.

2. An article of furniture comprising:

a pair of substantially identically formed end members,

a stationary lower frame disposed between said end members,

a movable upper frame normally disposed in superimposed relationship above said lower frame,

an elongated straight track disposed within each of said end members, said tracks normally extending in a straight horizontal direction, said tracks being pivotally mounted on said end members to permit downward pivotal movement of the forward ends of said tracks and limited linear movement of said tracks with respect to said end members,

a roller carried by each end of said upper frame, said rollers being mounted for horizontal rotational movement within said tracks,

spring means within said end members normally urging said tracks toward their normal straight horizontal positions,

a pair of vertically directed trackways disposed adjacent the forward portions of said end members,

a roller carried by the forward end of each of said tracks, said rollers being mounted for rotational movement within said trackways upon the pivotal movement of said tracks,

said upper frame being mounted for movement forwardly and downwardly to a position directly adjacent to said lower frame, in which the upper surfaces of said frames are disposed in substantially the same plane,

said rollers on said upper frame being adapted to move forwardly along said tracks and to pivot the forward ends of said tracks downwardly, the rollers at the forward ends of said tracks being adapted to move downwardly within said trackways, said tracks also being adapted to move slightly forwardly with respect to said end members,

said upper frame being adapted to be moved upwardly and rearwardly back to its normal position, said spring means being adapted to assist in lifting said upper frame and returning said tracks toward their normal positions, and said rollers being adapted to move in the opposite directions within said tracks and trackways.

3. An article of furniture comprising:

a pair of end members,

a stationary lower frame disposed between said end members,

a movable upper frame normally disposed in superimposed relationship above said lower frame,

an elongated straight track disposed within each of said end members, said tracks normally extending in a straight horizontal direction, said tracks being pivotally mounted on said end members to permit downward pivotal movement of the forward ends of said tracks to a downwardly inclined angular position,

a roller carried by each end of said upper frame, said rollers being mounted for horizontal rotational movement within said tracks.

resilient means urging said tracks toward their normal straight horizontal positions,

said upper frame being mounted for movement forwardly and downwardly to a position directly adjacent to said lower frame in which the upper surfaces of said frames are disposed in substantially the same plane,

said rollers on said upper frame being adapted to move forwardly along said tracks and to pivot the forward ends of said tracks downwardly to a downwardly inclined angular position,

said upper frame adapted to move upwardly and rearwardly back to its normal position, said resilient means being adapted to assist in lifting said upper frame and returning said tracks toward their normal positions, and said rollers being adapted to move in the opposite directions within said tracks.

4. The structure described in claim 3, and

locking means engageable between the forward side of said lower frame and the rearward side of said upper frame to hold said upper frame adjacent to said lower frame,

said locking means adapted to be automatically engaged when said upper frame is brought into adjacent alignment with said lower frame.

5. The structure described in claim 4, said locking means including

a normally outwardly extending retractable spring latch bolt carried by the side of one of said frames, and

a complementarily formed opening engageable with said latch bolt carried by the side of the other frame,

said latch bolt adapted to be disengaged from said opening upon upward tilting movement of the forward edge of said upper frame.

6. An article of furniture comprising:

a pair of end members.

a stationary lower frame disposed between said end members,

a movable upper frame normally disposed in superimposed relationship above said lower frame,

an elongated straight track disposed within each of said end members, said tracks normally extending in a straight horizontal direction, said tracks being pivotally mounted to permit downward pivotal movement of the forward ends of said tracks to a downwardly inclined angular position,

a roller carried by each end of said upper frame, said rollers being mounted for horizontal rotational movement within said tracks,

said upper frame being mounted for movement forwardly and downwardly to a position directly adjacent to said lower frame in which the upper surfaces

of said frames are disposed in substantially the same plane,

resilient means resisting the downward movement of said upper frame,

said rollers on said upper frame being adapted to move forwardly along said tracks, said rollers as they reach the forward ends of said tracks being adapted to pivot said forward ends of said tracks downwardly to a downwardly inclined angular position to guide said upper frame downwardly,

said upper frame adapted to be moved back to its normal position by first lifting said upper frame upwardly to pivot the forward ends of said tracks back to their normal straight horizontal positions and then moving said upper frame rearwardly, with said rollers moving rearwardly along said tracks, said resilient means being adapted to assist in lifting said upper frame.

7. An article of furniture comprising:

a pair of end members,

a stationary lower frame disposed between said end members,

a movable upper frame normally disposed in superimposed relationship above said lower frame,

an elongated straight track disposed within each of said end members, said tracks normally extending in a straight horizontal direction, said tracks being pivotally mounted to permit downward pivotal movement of the forward ends of said tracks to and from a downwardly inclined angular position,

a roller carried by each end of said upper frame, said rollers being mounted for horizontal rotational movement within said tracks,

said upper frame being mounted for movement forwardly and downwardly to a position directly adjacent to said lower frame in which the upper surfaces of said frames are disposed in substantially the same plane,

said rollers on said upper frame being adapted to move forwardly along said tracks, said rollers as they reach the forward ends of said tracks being adapted to pivot said forward ends of said tracks downwardly to a downwardly inclined angular position to guide said upper frame downwardly,

said upper frame adapted to be moved back to its normal position by first lifting said upper frame upwardly to pivot the forward ends of said tracks back to their normal straight horizontal positions and then moving said upper frame rearwardly, with said rollers moving rearwardly along said tracks.

References Cited in the file of this patent

UNITED STATES PATENTS

126,862	Wunsch et al.	May 14, 1872
423,641	Stock et al.	Mar. 18, 1890
1,804,820	Stackhouse	Apr. 12, 1929
2,328,411	Bergstrom	Aug. 31, 1943
2,557,734	Fox	June 19, 1951
2,937,384	Fossum	May 24, 1960
2,955,297	Bailey	Oct. 11, 1960
2,972,754	Weidner	Feb. 28, 1961

FOREIGN PATENTS

200,618	Switzerland	Jan. 2, 1939
69,273	Norway	Nov. 5, 1945
1,195,573	France	Nov. 18, 1959